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THE EFFECTS OF CHANGES IN MINIMUM WAGE ON EMPLOYMENT IN THE COVERED AND UNCOVERED SECTORS IN INDONESIA[1]

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ABSTRACT

This study examines the effects of changes in minimum wage on employment in the covered and uncovered sectors in Indonesia using an individual micro-level data set from 1989 to 2003. Since the Indonesian Labor Force Survey data are not a panel, this study applies pooled cross-sectional time-series methodology to explore the impact of the minimum wage across individual workers. All of the equations are analyzed separately in urban and rural labor markets, as well as the male and female labor market. The results suggest that an increase in minimum wage is more likely to decrease the covered sector employment and to increase the uncovered sector employment. These results also indicate a displacement effect from the covered sector to the uncovered sector, as suggested by the two-sector model. In addition, this study found the displacement effect is stronger for women, indicating that female workers are the more likely to be hurt as the result of an increase in minimum wage. Compared to urban areas, the effects in rural areas are somewhat lower, indicating that minimum wage is less binding, given the dominance of the traditional agriculture sector.

Keywords: *Minimum Wage, Employment, Covered Sector, Uncovered Sector*

INTRODUCTION

The effect of minimum wage laws on employment has been the subject of much debate in the literature since the early 1990s. Based on the standard theory, a standard competitive model predicts that a minimum wage which is above the equilibrium level will lower the level of employment. Contrary to the standard competitive model, the monopsony model predicts that an increase in minimum wage, under particular conditions, leads to an increase in employment. The empirical results usually depend on several factors, including the labor market conditions, the methodology (time-series, cross-sectional or panel data), the object of the study (developed or developing countries), the measurement of the minimum wage variable, and the unit of observation (individual or aggregate level).

There are large numbers of empirical studies on the effects of minimum wage on employment in developed countries. One of the most influential of such studies was the "natural experiment" study conducted by Card and Krueger (1995) in the United States. Using the data from fast-food restaurants in New Jersey and Pennsylvania, they found that an increase in New Jersey's minimum wage had potential positive effects on employment, supporting the presence of the monopsony model. Contrary to Card and Krueger (1995), the other influential studies conducted by Neumark *et al* (2004) consistently found negative effects of minimum wage on employment, supporting the presence of the standard competitive model.

[1] This article has been awarded as 2nd best paper of JIEB's Best Paper Awards 2010.

Contrary to developed country studies, there are limited empirical studies on the effects of minimum wage on employment in developing countries. Most have been conducted in Latin American developing countries. Compared to developed countries, developing countries generally show different characteristics, given a high proportion of workers in the uncovered sector. An increase in minimum wage is therefore also predicted to have a substantial indirect impact on workers in the uncovered sector, assuming flexible labor mobility between covered and uncovered sectors. Based on the two-sector model firstly constructed by Welch (1974), the excess supply of labor in the covered sector as the minimum wage increases potentially generates a displacement effect for employment in the covered sector into the uncovered sector. Specifically, this effect not only shifts or affects workers who were previously in the covered sector but also moves people who were previously not in the covered sector and have been encouraged to enter the covered sector by the minimum wage imposition.

Using the individual micro level data from 1996 to 2003, this study provides the possibility to explore the impact of the minimum wage across different sectors (or statuses) of employment among individual workers. The objective of this study is, therefore, to see how the distribution of workers across different sectors of employment changes as a result of an increase in minimum wage. As predicted by the two-sector model, there is a possibility that an increase in minimum wage will displace some workers affected by the minimum wage from the covered sector to the uncovered sector (see for example Gindling and Terrell, 2007; Arango and Pachon, 2004; and Baanante, 2004).

Unlike the previous studies using micro level data in developing country cases (see for example Fajnzylber, 2001; and Maloney and Nunez, 2001), this study cannot provide a panel of individuals due to data unavailability in Indonesia, so, as an alternative, a pooled cross-sectional time-series methodology will be employed. The previous developing countries study that is relatively close to this study's methodology is that of Gindling and Terrell (2007) on Costa Rica.

Gindling and Terrell (2007) tried to test whether the minimum wage affected wage and employment throughout the distribution, using the predicted wage across the skill level of each worker, separately for the covered and uncovered sectors. In their case, paid employees are categorized as covered sector employment, while self-employed (and unpaid family worker) are defined as uncovered sector employment. Comparing the result from Linear Probability Model (LPM) and the Probit model, they found that an increase in minimum wage of 10% is likely to decrease the probability of being employed in the covered sector by between 0.4% and 1%. The effect was larger at the bottom of the distribution.

Although this study's methodology is relatively close to the methods of Gindling and Terrell (2005, 2007), there are a number of improvements to their methodology as this study's contribution to the developing economies literature. Firstly, using the multinomial logit model makes it possible to observe the more complete effect of the minimum wage on several categories of employment in both the covered and uncovered sectors by the minimum wage, including paid employment, self-employed, unpaid family worker and the unemployed. Secondly, this study treats those effects separately in terms of the labor market in urban and rural areas, as well as in terms of the male and female labor market, which is not considered in Gindling and Terrell (2007). It is generally assumed that the minimum wage policy implementation is less effective in rural areas than in urban areas, given the dominance of the traditional agriculture sector. In addition, male and female workers are treated separately because they have different labor

market characteristics. In practice, males are likely to work as either paid employed or self-employed, while in contrast there is a high proportion of females as unpaid family workers because of their domestic responsibilities that require more flexible working hours.

The rest of this paper is organized as follows. The second section describes the minimum wage policy in practice in Indonesia. The third section explains the data and research methodology used in this study. The fourth section reports the main findings. The final section provides conclusions.

MINIMUM WAGE POLICY IN INDONESIA

The minimum wage level in Indonesia is generally set regionally across 33 provinces. Before 2001, in the centralization era, the central government determined the level of each provincial minimum wage based on the recommendation from the provincial (regional) government, while after the decentralization era (after 2001) the regional government has the power to set their minimum wage level. Before decentralization, provinces mainly had just one level of the minimum wage that was applied throughout the entire region, but after the decentralization era, several minimum wages (sub-minimum wage) are allowed to exist for different municipalities/cities (lower level region) within a province and, in some cases, for specific sectors of activity, as long as they are not below the provincial minimum wage level (Suryahadi *et al.*, 2003). In this case, four provinces in Java and Bali (West Java, Central Java, East Java, and Bali) have their own municipality and city minimum wages besides their provincial minimum wage, while provinces outside Java tend to set only one minimum wage level within a province.

In practice, the transfer of power in determining the level of the minimum wage to the regional government has had a big effect on minimum wage trends. In recent times, the combination of local pressures and stronger labor unions at regional level has significantly contributed to a large minimum wage increase in most Indonesian provinces. On average, nominal minimum wages increased by 30% per year in 2001 and 2002 (Suryahadi *et al.*, 2003)[2]. Although this increase is based primarily on the increase of the cost of minimum basic living needs (the so-called KHM), this all occurred against the slow growth of an economy which was still struggling to recover after the major economic crisis in 1997-1998. Compared to the other Asian countries with similar stages of development, the average minimum wage level in Indonesia is only lower than the minimum wages in Philippines and Thailand, but it is relatively higher than the minimum wages in Vietnam, Cambodia, Sri Lanka, Pakistan, and Bangladesh (Manning, 2003). In practice, there is little consideration of employment conditions or international competitiveness which both harm many employers. This condition clearly indicates the need for better understanding of how the increase in the minimum wage level will affect employment, making this study an important policy evaluation.

The compliance with the minimum wage policy in Indonesia, and also in most developing countries, is likely to be low. In Honduras, for example, 32% of total employment is paid below the minimum wage level, while in Costa Rica, more than 25% of full-time paid employees are paid below the minimum wage level (Gindling and Terrell, 2007). In Indonesia, in 2003, more than 18% of paid employees in urban areas are paid below the minimum wage level, while in rural areas more than 29% of paid employees are paid below the minimum wage level.

[2] There is even evidence that an increase in minimum wage is far above the regional inflation, such as in West Java and East Java (Manning, 2003).

Table 1. Compliance with the Minimum Wage (%), 1996-2003

	1996	1997	1998	1999	2000	2001	2002	2003
National (Aggregate)								
Less than MW[a]	38.20	33.79	33.43	30.78	29.62	24.72	24.78	21.53
Fraction at MW[b]	6.44	5.86	5.42	5.09	5.06	4.48	5.05	3.75
More than MW[c]	55.36	60.35	61.15	64.13	65.32	70.80	70.17	74.72
Urban								
Less than MW	28.40	24.41	26.05	24.13	23.19	21.59	21.75	18.19
Fraction at MW	6.32	5.53	4.91	4.77	4.95	4.02	4.95	3.69
More than MW	65.28	70.06	69.04	71.10	71.86	74.39	73.30	78.12
Rural								
Less than MW	49.20	44.42	42.29	39.24	39.08	31.20	31.72	29.51
Fraction at MW	6.57	6.23	6.03	5.51	5.21	5.42	5.28	3.89
More than MW	44.23	49.35	51.68	55.25	55.71	63.38	63.00	66.60

Note: [a] Less than MW is the fraction of paid employees which earn below the minimum wage level
[b] Fraction at MW is the fraction of paid employees which earn around the minimum wage level (using 5% rounding approximation)
[c] More than MW is the fraction of paid employees which earn above the minimum wage level
Source: Calculated from Sakernas, 1996-2003

Although the compliance is relatively low, there is a tendency for it to increase substantially in medium and large-scale establishments when labor unions become effective, especially after the political liberalization which followed the economic crisis and downfall of Soeharto's political dictatorship in 1998. As presented in table 1, a decline in the percentage of earnings below the minimum wage after 1996 was one indication that the minimum wage has become more binding in Indonesia. When workers are separated into different areas, it becomes clear that the minimum wage mostly affects urban areas. The high percentage of workers who earn below the minimum wage level in rural areas suggests that workers in rural areas are not greatly affected by the minimum wage, given the low compliance and lack of enforcement in those areas. On the other hand, urban areas, where medium and large-scale establishments are mostly situated, are the most likely to see compliance with the minimum wage regulation[3].

RESEARCH METHODOLOGY AND DATA

The effects of changes in minimum wage on employment are estimated using a multinomial logit model by a maximum likelihood method. Specifically, the labor market, firstly, is divided into three different employment categories (labor market status) based on the minimum wage coverage, represented by j: (1) j=0: uncovered sector employment; (2) j=1: covered sector employment; (3) j=2: unemployed. Individuals who are out of the labor force are excluded from the sample, assuming that they are not willing to work.

In general, the uncovered sectors are composed of self-employed and unpaid family workers, while the covered sector employment is paid employment. However, there is an

[3] Suryahadi *et al*'s (2001) survey found that only 4.9% workers in large-scale establishment are paid below the minimum wage level. In contrast, 63.3% and 30.4% workers are paid below the minimum wage level in small and medium scale establishments respectively.

incomplete coverage because of low compliance and lack of enforcement by the government, indicating that not all paid employment is covered by the minimum wage policy. In order to obtain a valid measure of covered sector employment, paid employees who are paid below the minimum wage level in this study will be considered as uncovered sector employment, although all paid employment is actually legally covered by the minimum wage policy. Therefore, in this study, uncovered sector employment includes (1) self-employed, (2) unpaid family workers and (3) paid employment that is paid below the minimum wage level (not covered by the minimum wage policy), while the covered sector employment is defined as paid employment that is paid at or above the minimum wage level (covered by the minimum wage policy)[4].

In comparison, Arango and Pachon (2004) defined salaried workers as covered sector employment, while self-employed is categorized as uncovered sector employment for Colombia. Fajnzylber (2001) classified registered workers as covered sector employment, while the uncovered sector is composed of self-employed and unregistered workers for Brazil. On the other hand, Gindling and Terrell (2007) classified self-employed (plus unpaid family workers) as uncovered sector employment, while paid employees are defined as covered sector employment for Costa Rica. A previous study on the impact of the Indonesian minimum wage on employment in the informal sector has also defined informal (uncovered) sector employment as non-wage employment; including self-employed and unpaid family workers (see Bird and Manning, 2002).

Extending the analysis of the labor displacement effect of minimum wage, as an alternative, this study estimates the employment equation using four different employment categories on the basis of labor market statuses:

(1) j=0: self-employed; (2) j=1: unpaid family worker; (3) j=2: paid employment; (4) j=3: unemployed. This is also important because, in the case of Indonesia, the distinction between sectors covered and uncovered by the minimum wage policy is defined on the basis of employment status (Sukatrilaksana, 2002). In general, as mentioned above, self-employment and unpaid family workers are grouped in uncovered sector employment, while paid employment is categorised as covered sector employment. However, the effect of minimum wage on this category of employment should be interpreted carefully due to the fact that, as mentioned above, there is a high proportion of paid employment that is paid below the minimum wage level (paid employment in the uncovered sector). Unlike three different employment categories above, we do not separate paid employment in the covered sector from paid employment in the uncovered sector in order to see the full effect of minimum wage on the paid employment category.

Specifically, a general expression for the conditional probabilities of each labor market status categories in the multinomial logit model, for example in the four labor market status model, is as follows:

$$\Pr(Y=j \mid x) = \frac{e^{gj(X)}}{\sum_{k=0}^{3} e^{gk(x)}} \qquad (1)$$

where dependent variable, Y, refers to the employment categories, j; and x is a set of the independent variables as follows: (1) log of real monthly provincial minimum wage, (2) a

[4] In general, covered sector employment is also defined as formal sector employment and uncovered sector employment is defined as informal sector employment. (see Gindling and Terrell, 2005). However, the Indonesian government does not clearly define the difference between the formal and informal sectors, particularly for paid employment that is paid below the minimum wage level (paid employment in the uncovered sector). In order to avoid the ambiguity of definition, covered-uncovered sector is used in this paper instead of formal-informal sector referring to a distinction on the basis of minimum wage coverage.

set of age group (>=50 years old is the reference group), (3) a set of marital status (singles are the reference group), (4) a set of highest education completed (not finished primary school yet or never been in school is the reference group), (5) a set of provincial dummy variables (West Java is the reference group), and (6) a set of year dummy variables (1996 is the reference group).

The individual level data set used in this study mostly originates from the Indonesian Labor Force Survey (the so-called Sakernas) from 1996 to 2003. This survey provides a rich source of the cross-sectional labor force data conducted annually since 1986 by the Indonesian Statistical Office (BPS), covering about 0.1% of population each year. In order to assess the impact of changes in minimum wage on employment, the sample consists of individuals (aged>15) who held one of the primary activities as follows: self-employed, unpaid family worker, paid employment and unemployed. Table 2 presents cross-tabulation of employment classification in our sample across urban-rural locations, as well as across male-female labor markets.

As presented in table 2, paid employees dominate both male and female urban employment. A large proportion of paid employment in urban areas (47.1%) indicates that urban areas have more advanced development achieved than rural areas. The highest proportion of paid employment in urban areas is employed in the manufacturing sector, accounting for more than 30% of total paid employment. On the other hand, in rural areas, a large proportion of self-employed and unpaid family worker (49.3% and 24.8% respectively) indicates limited jobs in the modern sector. Most of them (68% of total self-employed and 85% of total unpaid family workers) worked as farmers in the agricultural sector, given the dominance of traditional agriculture and rural activities in rural areas. In addition, when comparing by gender, it is seen that unpaid family workers are dominated by female employment both in urban and rural areas, while self-employed is dominated by male employment particularly in rural areas with the proportion of 60.1%. The summary statistics of the individual's characteristics used in this study are presented in table 3.

EMPIRICAL RESULTS

1. Kernel Density Estimate for Wage Distribution

Before discussing the multinomial logit results, the Kernel density estimate for wage distribution among paid employment in urban and rural areas is presented in figure 1. The y-axis illustrates the density, while the x-axis measures the ratio of real wage to the real minimum wage for each paid employee. The vertical line (ratio equal to 1) therefore indicates how binding the minimum wage level. As presented in figure 1(a), there is a significant spike around the vertical line for both males and females paid employment in urban areas. In comparison, the kernel density estimate suggests that female workers are

Table 2. Employment Status by Gender and Location (Pooled Data 1996-2003)

	Urban Areas			Rural Areas		
	Male	Female	Total	Male	Female	Total
Self-Employed (%)	36.04	30.51	33.98	60.10	33.07	49.34
Unpaid Family Worker (%)	4.1	17.17	8.97	11.03	45.71	24.83
Paid Employment (%)	51.32	40.00	47.1	25.19	15.45	21.31
Unemployed (%)	8.54	12.31	9.94	3.68	5.78	4.51
Observations (N)	175245	104027	279272	286185	189199	475384

Source: Calculated from Sakernas, 1996-2003

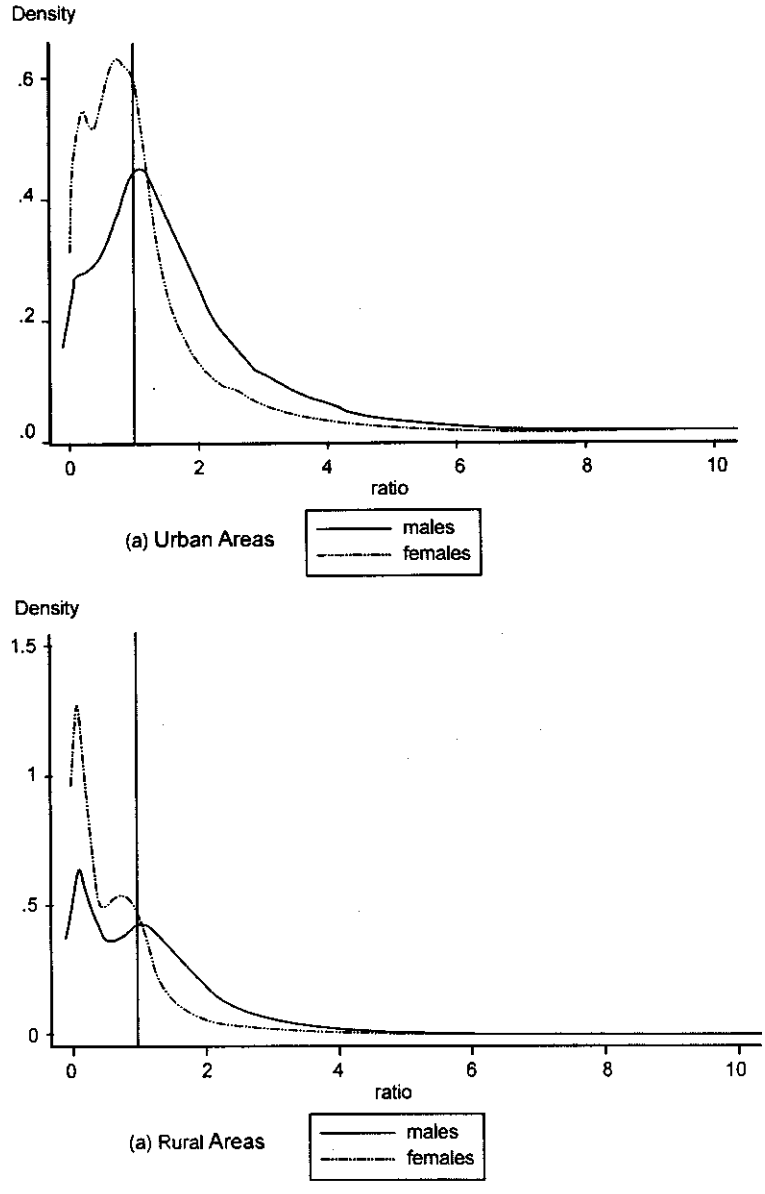
more affected by the minimum wage (as indicated by the higher density around the vertical line) than male workers. The main reason is because women generally earned less than men. As pointed out by Gindling and Terrell (2005), the larger wage effect is likely to be found in the category of employment with lower average wage. In addition, there is a cluster found below the minimum wage level (on the left side of the vertical line) for female paid employment, suggesting that there is a significant number of female workers still paid below the minimum wage level.

On the other hand, figure 1(b) indicates that paid employment in rural areas is not greatly affected by the minimum wage. The Kernel density estimate reveals that a high proportion of paid employment in rural areas is paid below the minimum wage level (on the left side of the vertical line) for both males and females. In practice, the minimum wage policy is not effectively enforced in rural areas because of the dominance of the traditional agriculture sector. In addition, the enforcement from government is still limited to large and medium enterprises mostly found in urban areas and in non-agriculture activities.

Table 3. Sample Means (Individual Level-Pooled Data 1996-2003)

	Urban			Rural		
	Male	Female	Total	Male	Female	Total
Marital Status:						
Married	0.706	0.570	0.656	0.748	0.705	0.731
Separated	0.022	0.118	0.058	0.029	0.132	0.070
Education:						
Primary	0.249	0.260	0.253	0.426	0.397	0.415
Junior H.S.	0.195	0.161	0.182	0.167	0.115	0.146
Senior H.S.	0.352	0.301	0.333	0.122	0.083	0.107
Academy	0.022	0.025	0.023	0.004	0.003	0.004
University	0.057	0.051	0.054	0.008	0.005	0.007
Age:						
age15-24	0.196	0.260	0.220	0.212	0.214	0.213
age25-34	0.297	0.284	0.292	0.250	0.254	0.252
age35-50	0.343	0.308	0.33	0.326	0.333	0.329
Lreal minimum wage	11.108	11.102	11.107	11.034	11.011	11.030
Real wage *	175,639	145,773	168,774	134,528	125,380	133,005
Lreal wage *	11.888	11.727	11.851	11.673	11.521	11.647
*Sector of Activities:**						
Mining	0.022	0.003	0.018	0.030	0.005	0.026
Industry	0.235	0.311	0.252	0.206	0.313	0.224
Electricity	0.010	0.003	0.009	0.005	0.001	0.004
Construction	0.133	0.020	0.107	0.212	0.032	0.182
Trade	0.129	0.186	0.142	0.052	0.071	0.055
Transportation	0.093	0.022	0.077	0.082	0.009	0.070
Finance	0.028	0.040	0.031	0.009	0.013	0.010
Services	0.311	0.398	0.331	0.230	0.379	0.255

Source: Calculated from Sakernas and BPS publication, 1996-2003
Note: * = is only used in the wage equation



Notes: Calculated from Sakernas, 1996-2003
The vertical line (ratio equal to 1) represents the minimum wage
An Epanechnicov kernel is used for kernel density with bandwith 0.01.

Figure 1. The Impact of Minimum Wage on Wage Distribution (Pooled Data 1996-2003)

2. The Effect of Minimum Wage on Employment

2.1. Three Categories of Labor Market Status

Firstly, the effect of the minimum wage on employment is estimated across three different employment (labor market status) categories based on the minimum wage coverage, including: (1) uncovered sector employment, (2) covered sector employment, and (3) unemployed. The Wald test results for pooling states over the multinomial logit estimate are presented in table 5. The results are reported separately across different combinations of employment categories for male and female workers in urban and rural areas. As presented in table 5, using all combinations of employment categories, we can reject the null hypothesis that the selected employment categories can be combined (or pooled). These results imply that the selected employment categories used in this section are behaviourally different.

In addition, the multinomial logit estimate assumes the Independence of Irrelevant Alternatives (IIA) between the selected categories (Long and Freese, 2006). IIA implies that the proportion of individuals choosing the selected categories will not change when one alternative category is omitted (or added). The Small-Hsiao tests for the Independence of Irrelevant Alternatives over the multinomial logit estimate using three different employment categories are reported in table 6. As presented in table 6, in all cases, we can accept the null hypothesis suggesting that the IIA assumption holds. By implication, the selected categories used in this section are independent of each other.

As presented in tables 7, in general we can see that an increase in minimum wage reduces the probability of being employed in the urban covered sector and increases the probability of being employed in the urban uncovered sector. Specifically, the coefficient of log of real minimum wage for male workers in the urban covered sector is negative with a marginal effect of -0.141, suggesting that an increase in minimum wage leads to a decline in the probability of men being employed in the urban covered sector. On the other hand, the coefficient of log of real minimum wage in the urban uncovered sector is positive with a marginal effect of 0.154, indicating that there is a potential displacement effect from the covered sector to the uncovered sector as the minimum wage increases. Similar to males, an increase in minimum wage decreases the probability of women being employed in the urban covered sector (marginal effect is -0.137) and increases the probability of women being employed in the urban uncovered sector (marginal effect is 0.150).

Table 5. Wald Tests for Pooling Employment Categories

Categories Tested	Urban Areas		Rural Areas	
	Male	Female	Male	Female
Covered Sector & Uncovered Sector	10648.83	10551.44	14919.93	9135.76
	(0.00)	(0.00)	(0.00)	(0.00)
Covered Sector & Unemployed	11748.23	9412.33	12931.24	14925.67
	(0.00)	(0.00)	(0.00)	(0.00)
Uncovered Sector & Unemployed	10608.47	4081.07	9576.75	4006.87
	(0.00)	(0.00)	(0.00)	(0.00)

Notes: Chi-squared test at 45 degree of freedom, p-value in parentheses.
H_0: All coefficients except intercepts associated with a given pair of categories are 0 (categories can be combined). Processed Data (2010).

Table 6. Small-Hsiao Tests for the Independence of Irrelevant Alternatives

Categories Omitted	Urban Areas		Rural Areas	
	Male	Female	Male	Female
Uncovered Sector	-702.71	29.968	-269.623	-108.467
	(1.00)	(0.97)	(1.00)	(1.00)
Covered Sector	-1.4e+03	-79.409	-2.0e+03	-985.89
	(1.00)	(1.00)	(1.00)	(1.00)
Uncovered Sector	-309.09	-1.2e+03	-3.4e+03	-2.2e+03
	(1.00)	(1.00)	(1.00)	(1.00)

Notes: Chi-squared test at 46 degree of freedom, p-value in parentheses.
H_0: Odds (Outcome-J vs Outcome-K) do not depend on other alternatives. Processed Data (2010)

Table 7. Employment Equation using Three Employment Categories

The Coefficient of Log Real MW	Uncovered Sector		Covered Sector		Unemployed	
	M.E.	P value	M.E.	P value	M.E.	P value
Urban Areas - Males	0.1540	0.000	-0.1408	0.000	-0.0132	0.026
Urban Areas - Females	0.1495	0.000	-0.1366	0.000	-0.0129	0.166
Rural Areas - Males	0.0902	0.000	-0.0793	0.000	-0.0109	0.000
Rural Areas - Females	0.0442	0.000	-0.0423	0.000	-0.0019	0.682

Note: The other independent variables include age groups, marital statuses, highest education levels completed, provincial and year dummy variables. Estimated by Multinomial Logit. Processed Data (2010).

Interestingly, the log of real minimum wage is negatively associated with the probability of men being unemployed. This result shows that an increase in minimum wage reduces the probability of men being unemployed with the marginal effects of -0.013 and -0.011 for urban and rural areas respectively. Although the marginal effect is relatively small, the result indicates that an increase in minimum wage has induced individuals who are unemployed (including discouraged workers) to work, particularly in the uncovered sector, for an additional family income because of some job losses in the covered sector. In contrast, the impact of minimum wage on the probability of women being unemployed is not significant. The full results suggest that without unemployment benefits, workers affected by an increase in minimum wage are less likely to remain unemployed, while others are more likely to find a job in the uncovered informal sectors (as self-employed or unpaid family workers).

The high percentage of workers who earn a wage below the minimum wage level suggests that workers in rural areas are not greatly affected by the minimum wage policy. For males, an increase in minimum wage leads to a decrease in the probability of being employed in the rural covered sector (marginal effect is -0.08), an increase in the probability of being employed in the rural uncovered sector (marginal effect is 0.09), and a decrease in the probability of being unemployed (marginal effect is -0.01). Compared to urban areas, the marginal effects are much smaller, indicating that the minimum wage is less binding in rural areas as predicted. These results confirm that workers in rural areas are less affected by the minimum wage policy.

In contrast, an increase in minimum wage decreases the probability of women being

employed in the rural covered sector (marginal effect is -0.04) and increases the probability of women being employed in the rural uncovered sector (marginal effect is 0.04). The marginal effects for female workers are smaller than those for male workers indicating that the minimum wage is less likely to affect female workers in rural areas. In practice, most rural female workers are employed in the agriculture sector, where generally the minimum wage is not binding for them. According to Dhanani and Islam (2004), they are generally assigned in simple weeding and harvesting operations in the agriculture sector with tasks demanding less skill and which tend to be low paid. The incidence of poverty, actually, is the main reason for females in rural areas participating in the labor force, although with relatively low earnings, indicating the need for an additional family income.

2.2. Four Categories of Labor Market Status

Extending the analysis, the labor market is distinguished into four different categories of employment based on their employment status: (1) self employed, (2) unpaid family worker, (3) paid employment and (4) unemployed. The Wald test results obtained using four employment categories are presented in table 8. Using four different employment categories, the chi-square statistics tend to be lower than the previous section using three employment categories. However, all combinations significantly reject pooling of any of the selected employment categories, implying that the selected employment categories used in this section are behaviorally different.

It is important to note that four different employment categories used in this section are based on their status of employment, while three different employment categories used in the previous section are based on the minimum wage coverage (covered or uncovered sectors). Therefore, although the selected combinations in the four different employment categories significantly reject pooling of any of the selected employment categories, it does not mean that the multinomial logit estimate using three different employment categories in the previous section is inappropriate. In other words, three employment categories discussed in the previous section are not an actual pool

Table 8. Wald Tests for Pooling Employment Categories

Categories Tested	Urban Areas		Rural Areas	
	Male	Female	Male	Female
Self-Employed & Unpaid Family Worker	8255.84 (0.00)	3341.85 (0.00)	33294.51 (0.00)	11127.41 (0.00)
Self-Employed & Paid Employment	13574.16 (0.00)	11176.83 (0.00)	25297.73 (0.00)	12317.07 (0.00)
Self-Employed & Unemployed	14978.83 (0.00)	11733.73 (0.00)	18015.22 (0.00)	16188.34 (0.00)
Unpaid Family Worker & Paid Employment	6069.78 (0.00)	6663.6 (0.00)	21452.28 (0.00)	17166.13 (0.00)
Unpaid Family Worker & Unemployed	2122.98 (0.00)	7576.35 (0.00)	5879.28 (0.00)	14429.59 (0.00)
Paid Employed & Unemployed	10021.07 (0.00)	4491.71 (0.00)	9582.39 (0.00)	7447.77 (0.00)

Notes: Chi-squared test at 45 degree of freedom, p-value in parentheses.

H_0: All coefficients except intercepts associated with a given pair of categories are 0 (categories can be combined. Processed Data (2010).

of four employment categories tested in this section. In three different employment categories, for example, paid employment category can be included in covered sector employment category (if they are paid at or above the minimum wage level) or uncovered sector employment category (if they are paid below the minimum wage level).

Table 9 reports the Small-Hsiao tests for the Independence of Irrelevant Alternatives (IIA) assumption between the selected employment categories. Although the IIA assumption is violated in some cases, particularly for female workers in urban areas, we can accept the null hypothesis in most cases, suggesting that the selected categories used in this section are independent of each other.

As presented in table 10, there is no significant impact of minimum wage on the probability of men being paid employed in urban areas, while in the previous section, using three employment categories, we can see that an increase in minimum wage significantly decreases the probability of men being employed in the urban covered sector. This evidence indicates that, for male workers, there is a potential shift from the paid employment category in the covered sector to the paid employment category in the uncovered sector as the minimum wage increases. In contrast, an increase in minimum wage decreases the probability of women being paid employed in urban areas (marginal effect is -0.029), indicating that an increase in the minimum wage is more likely to affect females' paid employment rather than males' paid employment.

Another important finding is the fact that an increase in the minimum wage raises the probability of being self-employed for men

Table 9. Small-Hsiao Tests for the Independence of Irrelevant Alternatives

Categories Omitted	Urban Areas		Rural Areas	
	Male	Female	Male	Female
Self-Employed	-708.5	336.201	-406.559	-4.3e+03
	(1.00)	(0.00)	(1.00)	(1.00)
Unpaid Family Worker	-1.8e+03	5.035	-5.3e+03	-3.0e+03
	(1.00)	(1.00)	(1.00)	(1.00)
Paid Employment	-601.570	526.276	-966.802	-4.6e+03
	(1.00)	(0.00)	(1.00)	(1.00)
Unemployed	-126.564	589.207	-4.4e+03	-3.8e+03
	(1.00)	(0.00)	(1.00)	(1.00)

Notes: Chi-squared test at 46 degree of freedom, p-value in parentheses.
H_0: Odds (Outcome-J vs Outcome-K) do not depend on other alternatives. Processed Data (2010).

Table 10. Employment Equation using Four Employment Cetgories

The Coefficient of Log Real MW	Self-Employed		Unpaid Family Worker		Paid Employment		Unemployed	
	M.E.	P value	M.E.	P value	M.E.	P value	M.E.	P value
Urban Areas - Males	0.0220	0.036	0.0071	0.163	-0.0169	0.139	-0.0122	0.041
Urban Areas - Females	-0.0038	0.781	0.0319	0.009	-0.0287	0.048	0.0006	0.947
Rural Areas - Males	0.0233	0.003	0.0067	0.217	-0.0202	0.010	-0.0097	0.002
Rural Areas - Females	-0.0395	0.000	0.0366	0.002	0.0027	0.738	0.0002	0.971

Note: The other independent variables include age groups, marital statuses, highest education levels completed, provincial and year dummy variables. Estimated by Multinomial Logit. Processed Data (2010).

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